NASA/GSFC/Atmospheric Chemistry and Dynamics Branch

Newsletter No. 10 2009

SHADOZ Notes

Southern Hemisphere ADditional OZonesondes:

A Data Set for Remote Sensing Research, Global Models, and Education.

The Archive

SHADOZ is a project to augment balloon-borne ozonesonde launches and to archive data from tropical and subtropical operational sites. The project was initiated in 1998 by NASA/ Goddard Space Flight Center with other US and international co-investigators. There are currently thirteen stations in the SHADOZ network. The collective data set provides the first profile climatology of tropical ozone in the equatorial region, enhances validation studies aimed at improving satellite remote sensing techniques for tropical ozone estimations, and serves as an educational tool for students, especially in the participating countries.

Data is publicly available at:

http://croc.gsfc.nasa.gov/shadoz

New northern sub-tropical stations planned to come online Hilo, Hawaii [20°N, 156°W] and Hanoi, Vietnam [21°N, 106°E]

SHADOZ CD-ROM

To increase access to SHADOZ profiles, a cd-rom is now available which mimics the website. Data are provided from 1998-2006. Contact PI Anne M. Thompson at anne@met.psu.edu for a copy.

TC4 Campaign

The TC4 = Tropical Composition, Clouds and Climate Coupling Mission was a SHADOZ-related experiment with augmented soundings at Heredia, Costa Rica and a 20-sonde set at Panama. The mission was to investigate the structure, properties, and processes in the tropical Eastern Pacific. Data can be accessed at the SHADOZ homepage.

TC4 Homepage: http://www.espo.nasa.gov/tc4

WMO/GAW-ACCENT Ozonesonde Experts Workshop

- Herman G. J. Smit

A meeting of ozonesonde experts was held from 02-04 February, 2009 at the Jülich Research Centre, Germany to set up a strategy, including recommendations and action plans, for future research on:
(i) the instrumental performance of ozonesondes and
(ii) methodologies for homogenization of sounding data record.

The meeting was organized and hosted by Dr. Herman G.J. Smit and Mrs, Gabi Nork from the Institute for Chemistry and Dynamics of the Geosphere: Troposphere (ICG-2). The first day of the meeting focused on instrumental and performance issues: the impact of box and pump temperatures on the measurements, conversion and pump flow efficiencies, the treatment of the background current, total ozone normalization, etc. The second day was dedicated to the inhomogenities/discontinuities in the sounding data record. These include different sensing techniques (e.g. ECC, BM , KC96, ….), different sensor types (e.g. ECC: SPC-4A,-5A, -6A , and ENSCI-Z), different sensing solutions types (SST1.0=1%KI+full buffer, SST0.5=0.5%KI+half buffer, or any other SST), and different radiosonde types (P,T,Z). At the end of the meeting, recommendations and action plans for future research were made with regard to: (i) instrumental performance of ozonesondes and (ii) construction and validation of empirical transfer functions to homogenize indiscontinuities of sounding data records. Key issue identified for future research included applications of the background current in the troposphere, pump flow efficiencies for stratosphere, chemical kinetics (stoichiometry), and normalization.

Group photo of attendees. Courtesy of H. Smit.

4th Ticosonde Workshop

- Jessica Valverde & Henry Selkirk

The Ticosonde Workshop took place from 26-27 March, 2009 at the Universidad Nacional (UNA) in Heredia, Costa Rica. It was organized by Dr. Jessica Valverde-Canossa from the UNA, Dr. Henry Selkirk from NASA Goddard Space Flight Center and Mauricio Zamora from Centro Nacional de Alta Tecnología (CENAT). During the workshop scientists from Costa Rica, North America, México and Panamá were present leading to interesting discussions and future partnerships. The Workshop was opened to the public with UNA students assisting. The following themes were discussed:

Group photo of attendees. Courtesy of J. Valverde.

» The SHADOZ and Cryogenic Frostpoint Hygrometer (CFH) balloon-borne program: During this session the discussion was focus on Costa Rica and SHADOZ. Ticosonde began in Costa Rica in 2004 with radiosonde launches and in 2005 Costa Rica joined the SHADOZ program. Since then, more than 200 balloon-borne water vapor and ozone launches have taken place. Costa Rica is one of the four northern tropics ozone stations participating in SHADOZ and the only water vapor station in the tropics offering high-frequncy launches (twice per month). This makes Costa Rica a particularly good candidate for WMO´s Global Climate Observing System's (GCOS) Reference Upper Air Network (GRUAN) <http://www.wmo.ch/pages/prog/gcos/index.php?name=GRUAN>.

» Results from recent observational campaigns: Ticosonde in Costa Rica has been part of several NASA intensive observational campaigns: Tropical Cloud Systems and Processes (TCSP) Experiment (2005), Ticosonde Veranillo (2006), Costa Rica -Aura Validation Experiment (CR-AVE - 2006), and Tropical Composition Cloud and Climate Coupling (TC4 - 2007). Presentations during this workshop focused on the latest Ticosonde campaign that took place in Costa Rica and Panamá: Ticosonde TC4.

» Enhancing climate observations in Costa Rica: During this session we discussed new projects involving measurements that enhance our knowledge about climate in the Central American Region, such as Costa Rica being part of NASA's Micropulse Lidar NETwork (MPLNET) and the AEROsol NETwork (AERONET) programs, SO_2 measurements to study the volcanic emissions influence on the Central Valley, re-starting radiosonde measurements in Costa Rica and initiating peroxides measurements at the tropical forest to study the oxidizing capacity of the atmosphere. This last project is already partly financed and will start on the 2010.

On the last day scientists, students and the media visited the Antiguo Radar Station at the Juan Santamaría International Airport (SJO) located in Alajuela about 20 km from the capital of Costa Rica, San José to observe one of the weekly CFH ozone launches taking place at that location (http://www.prensalibre.co.cr/2009/marzo/28/abanico01.php).

For further information about the Workshop please refer to the following URL where the scientific program and abstracts are posted:
http://acdbext.gsfc.nasa.gov/People/Selkirk/4th_Ticosonde_WorkshopProgram_and_Abstracts.pdf

NASA Renews SHADOZ for Four Years

- Anne M. Thompson - PI

In response to a NASA "ROSES" (Research Opportunities in Space and Earth Sciences) solicitation for ground-based measurements in 2008, SHADOZ participants proposed and were successful in renewing SHADOZ for the 2009-2012 period. The selections were announced in December 2008. In the US, Principal Investigator Anne Thompson (Penn State), with Co-Investigators Samuel Oltmans (NOAA's ESRL/ Global Monitoring Division) and Frank Schmidlin (NASA's Wallops Flight Facility) were joined in their proposals with SHADOZ Co-Investigators from KNMI (Suriname), Meteo-Swiss (Kenya), South African Weather Service (Irene), Hokkaido and Kyoto Universities in Japan (for Watukosek and Hanoi), La Réunion University (France). Important letters of support came from (1) H. Vömel of the German Weather Service, now the lead on GRUAN (GCOS [Global Climate Observing System] Reference Upper Air Network) due to the leadership of SHADOZ in setting high standards for procedures in a volunteer sounding network and (2) Environment Canada's Ed Hare, Archiver of the WMO-sponsored "World Ozone and UV Data Center" (www.woudc.org) where SHADOZ data are transmitted annually for further distribution to the world scientific community.

We thank everyone named above and those working with them and at *all* SHADOZ stations, for support at proposal time and above all, for carrying on an internationally recognized network (now > 4000 profiles!) in a twelfth year. Congratulations to all in SHADOZ!

SHADOZ Science Team

Anne M. Thompson (Penn. State U., USA)
Bertrand Calpini (Aerological Sta., Swit.)
Gert J.R. Coetzee (SAWS, S. Africa)
Kok Kee Chow (Malaysian Met. Service)
Masatomo Fujiwara (Hokkaido U., JAP)
Neusa Paes Leme (INPE, Brazil)
Samuel Oltmans (NOAA/ESRL, USA)
Françoise Posny (La Réunion, Univ., FRA)
Masato Shiotani (Kyoto, Univ., JAP)
Francis Schmidlin (NASA/WFF, USA)
Jessica Valverde (U. Nacional, Costa R.)
Ge Verver (KNMI, Netherlands)
Holger Vömel (Univ. Colorado, USA)
Jacquelyn Witte (SSAI, USA)

For more information about SHADOZ or to access the data archive, visit our web site:
http://croc.gsfc.nasa.gov/shadoz

SHADOZ Notes is published for and about the data archive, tropical ozone research, remote sensing validation and education. SHADOZ has been supported by NASA's ACMAP, TOMS and Aura projects. Individual SHADOZ sites are also supported by in-country agencies and universities.

The SHADOZ homepage also gives technical information for each station, and addresses of the Co-Investigators. The Co-I's are responsible for the original data processing and should be consulted for details of their methods and appropriate references to their work.

SHADOZ Principal Publications

Thompson, A. M. et al., Southern Hemisphere Additional Ozonesondes (SHADOZ) 1998-2004 tropical ozone climatology. 3. Intrumentation, station-to-station variability, evaluation with JOSIE-2000 results, J. Geophys. Res., doi:10.1029/2005JD007042, 2007.

Thompson, A. M., et al., Southern Hemisphere ADditional Ozonesondes (SHADOZ) 1998-2000 tropical ozone climatology. 2. Tropospheric variability and the zonal wave-one, J. Geophys. Res., 108, 8241, doi: 10.1029/2002JD002241, 2003.

Thompson, A. M. et al., Southern Hemisphere ADditional Ozonesondes (SHADOZ) 1998-2000 tropical ozone climatology. 1. Comparison with Total Ozone Mapping Spectrometer (TOMS) and ground-based measurements, J. Geophys. Res., 108, 8238, doi: 10.1029/2001JD000967, 2003.